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BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Continue Electric Integrated Resource Planning and Related Procurement Processes.	R.20-05-003 (Filed May 7, 2020)

REPLY COMMENTS OF ENVIRONMENTAL DEFENSE FUND ON MID-TERM RELIABILITY ANALYSIS AND PROPOSED PROCUREMENT

Michael Colvin
Director, Legislative and Regulatory Affairs
California Energy Program
ENVIRONMENTAL DEFENSE FUND
(415) 293-6122
mcolvin@edf.org

Ellison Folk
Yochanan Zakai
SHUTE, MIHALY & WEINBERGER LLP
(415) 552-7272
folk@smwlaw.com
yzakai@smwlaw.com

Attorneys for Environmental Defense Fund

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I. Introduction

Pursuant to the timeline established by the Administrative Law Judge's March 12, 2021 email, Environmental Defense Fund (EDF) submits the following reply comments on the Administrative Law Judge's Ruling Seeking Feedback on Mid-Term Reliability Analysis and Proposed Procurement Requirements (Ruling).

EDF, in partnership with Clean Air Task Force, engaged researchers from E3, Princeton, and Stanford to use different reliability models to evaluate various ways that California can decarbonize its electricity supply. This modeling indicates that California needs a significant amount of new renewable and clean firm resources to meet its reliability and decarbonization targets. The study found that at least 20-25 GW of new wind and solar resources are necessary by 2045 in the three models under scenarios where renewable resources are complemented by clean firm power resources; that capacity increases to 470 GW without clean firm power resources. The study indicates that California should procure approximately 30 GW of clean firm power resources by 2045 because portfolios with at least one clean firm resource are 32-53% cheaper than portfolios with solar, wind, and batteries only.[1]

[1] Attachment 1 at 7.

EDF raises the results of these scenarios to support the Commission's mid-term procurement proposal and in response to other parties' comments. The Commission's mid-term procurement decision should authorize the procurement of a proportional amount of California's 2045 needs identified in EDF's study: 20-25 GW of new wind and solar resources, and 30 GW of new clean firm power. Later this year, the Commission should authorize additional procurement to come online between 2027-2031, because customers will benefit from providing developers longer lead times, especially for the procurement of clean firm technologies with less mature markets.

An article on EDF's modeling effort, *Clean Firm Power is the Key to California's Carbon-Free Energy Future* is available in the journal *Issues in Science and Technology*.[2] Our conclusions, a description of the three different models used, and the inputs for each scenario evaluated, are found in Attachment 1 to these comments and discussed below.

II. EDF's Response to Opening Comments on the Questions Presented in the Ruling

8. Comment on the total annual capacity requirements recommended. If you would make any adjustments, explain your rationale.

EDF supports increasing the quantity of procurement required, provided that the additional procurement be scheduled to come online in 2025 or later and is comprised exclusively of greenhouse gas (GHG) emissions-free resources. A broad range of parties support the incremental procurement of clean resources, and multiple studies show that California needs significantly more renewable and clean firm resources to meet its decarbonization targets. EDF's

[2] Long, Jane C.S., Ejeong Baik, Jesse D. Jenkins, Clea Kolster, Kiran Chawla, Arne Olson, Armond Cohen, Michael Colvin, Sally M. Benson, Robert B. Jackson, David G. Victor, and Steven P. Hamburg, *Clean Firm Power is the Key to California's Carbon-Free Energy Future*, Issues in Science and Technology (March 24, 2021), https://issues.org/california-decarbonizing-power-wind-solar-nuclear-gas/.

modeling found that at least 20-25 GW of new wind and solar resources, accompanies by 20-100 GW of new short-term storage resources are necessary by 2045 under scenarios that include clean firm power resources. While these are large procurement numbers, they would be even higher without a clean firm power resource.

In addition, California Environmental Justice Alliance (CEJA) and Sierra Club cite modeling from the Commission, California Air Resources Board, and California Energy Commission to show the need for 13-20 GW of new solar capacity and 4-5 GW of new wind capacity.[3] Center for Energy Efficiency and Renewable Technologies likewise supports additional procurement, reasoning that "expected load growth now makes under-procurement an increasingly likely possibility."[4] Union of Concerned Scientists also provides its own modeling showing that at least 10 GW of new wind and solar capacity will be required in a variety of decarbonization scenarios.[5] Therefore, authorizing the procurement of at least 20-25 GW of new renewable resources by 2045, with a proportional share acquired in this mid-term procurement window, is a no-regrets option.

[3] Comments of California Environmental Justice Alliance and Sierra Club on Mid-Term Reliability Analysis and Proposed Procurement Requirements, at 5-8 (March 26, 2021) (CEJA/Sierra Club Comments).

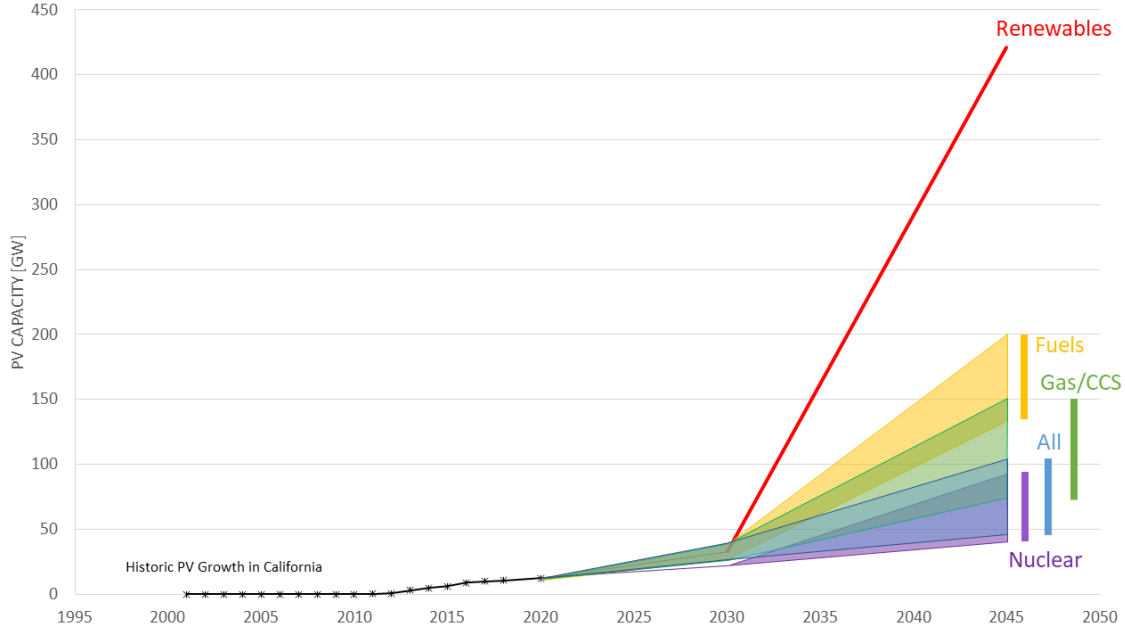
[4] Opening Comments of Center for Energy Efficiency and Renewable Technologies on Administrative Law Judge's Ruling Seeking Feedback on Mid-Term Reliability Analysis and Proposed Procurement Requirements, at 9 (March 26, 2021); Comments of Environmental Defense Fund on Mid-Term Reliability Analysis And Proposed Procurement, at 5 (March 26, 2021) (Environmental Defense Fund Comments).

[5] Opening Comments of the Union of Concerned Scientists on the Ruling Seeking Feedback on Mid-Term Reliability Analysis and Proposed Procurement Requirements, at 4 (March 26, 2021).

9. Comment on whether the suggested amount of geothermal and/or long-duration storage resources should be required to be procured as part of the mid-term procurement requirements.

Clean firm power, with the ability to respond to dispatch signals or produce a consistent output, is needed to maintain system reliability at a reasonable cost. Across the various models used, our study indicates that solely relying on solar, wind, and storage results in building significant excess capacity that would not be necessary in scenarios using clean firm power. Figure 1 below shows the solar capacity required for different resource mixes to meet California's reliability needs and achieve zero emissions by 2045. The red curve is a portfolio of solar, wind, and batteries only; this is the trajectory that California is currently on absent a new policy signal. Other curves show different renewables and clean firm power mixes including zero-carbon fuels, carbon capture and storage (CCS), and nuclear, whose resource characteristics mirror geothermal. The bars on the right show the range of results obtained by the different models.

Figure 1: Solar Capacity Needed for a Decarbonized Grid with Different Resources



An ambitious investment in clean firm power, with a capacity similar in magnitude to California's existing gas fleet—roughly 25-40 gigawatts—could eliminate the need for ten times that amount of solar and wind capacity. If California instead built only solar, wind, and storage capacity to meet its reliability needs, rates in 2045 would increase by about 65 percent.[6] By contrast, using clean firm power—including geothermal—California could keep rates similar to those found today.[7] As noted above, this does not mean that new solar and wind resources are unnecessary; quite the contrary, there is room in the system for all of these renewable resources. However, to keep costs affordable, investing in clean firm power is a prudent path to take.

This finding shows the importance of the Commission evaluating costs and benefits over a long planning horizon and modeling electric decarbonization targets in every procurement. Southern California Edison argues that new geothermal capacity would increase portfolio costs in 2030.[8] However, modeling through 2045 and accounting for grid decarbonization shows overwhelming cost savings with the use of clean firm power resources like geothermal.[9] EDF encourages the Commission to think about not just individual procurement cost but overall system cost. San Diego Gas and Electric's proposal to place a cost cap on geothermal resources[10] is similarly misplaced because it ignore the long-term benefits provided by clean firm power.

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[6] Attachment 1 at 4.

[7] Attachment 1 at 1.

[8] Southern California Edison Company's Comments on Administrative Law Judge's Ruling Seeking Feedback on Mid-Term Reliability Analysis and Proposed Procurement Requirements, at 23 (March 26, 2021) (footnote 23).

[9] Across all the scenarios researchers modeled, portfolios with at least one clean firm power option were 32-53% cheaper than the renewable energy and batteries only portfolio. Attachment 1 at 7.

[10] San Diego Gas & Electric Company Opening Comments in Response to Ruling Seeking Feedback on Mid-Term Reliability Analysis and Proposed Procurement Requirements, at 9-10. (March 26, 2021).

While the cost of new clean firm power resources on a per unit basis may be higher than wind and solar, the overall system cost is dramatically less when clean firm power resources are added onto the system. If the Commission were to follow the guidance from SCE or SDG&E, it amounts to a short-termism where the state would remain on the red renewables-only curve in Figure 1. EDF encourages the Commission to recognize that a slightly more expensive investment in clean firm power resources will act as a cost-containment mechanism for the entire resource portfolio over time. Because California does not have experience procuring a large amount of clean firm power resources, starting now will give us valuable lessons learned and help create a market signal to bring down costs further over time.

Next, the Commission should authorize additional procurement with a longer lead time. California Energy Storage Alliance notes that just-in-time procurement, with only 2-4 years to bring new projects online, is too rushed.[11] EDF agrees that in order keep costs low for developers and ratepayers

> the Commission should strive to allow for lead times of at least seven years, which will allow time for any necessary transmission upgrades and larger, more complicated projects to come online with greater certainty and feasibility; a seven-year timeframe, as a rule of thumb, accounts for supply chain considerations, interconnection and construction timelines, and infrastructure upgrade needs.[12]

American Clean Power similarly requests that the Commission immediately address "longer-term resource needs (i.e., 2027-31). Providing this procurement signal now will help spur contracting to further the development of longer-lead time resources and facilitate the longer-

[11] Comments of The California Energy Storage Alliance on the Administrative Law Judge's Ruling Seeking Feedback on Mid-Term Reliability Analysis and Proposed Procurement Requirements, at 1-2 (March 26, 2021).

[12] *Id*.

term planning necessary to bring these resources online by 2027."[13] Longer lead times are particularly important for the procurement of resources with less mature markets. Later this year, the Commission should authorize a long-lead-time procurement for renewable and clean firm power. Authorizing long-lead-time procurement will spur the market for these resources and keep long-term customer costs reasonable.

Finally, the comments of the Joint Environmental Parties emphasize that the Ruling's procurement proposal fails to meet the Commission's obligation to ensure this procurement complies with California's decarbonization mandates.[14] The Public Advocates Office also explains that it is in ratepayers' interest to "consider reliability planning holistically with GHG emissions reductions procurement;"[15] the Ruling's procurement proposal fails to do so. The Commission should not now—or ever again—authorize procurement without modeling the procurement's long-term impact on grid decarbonization.

Regardless of the specific path the Commission takes for future procurement, it should frequently consider long-term decarbonization and reliability needs, and then send the multiple market signals regarding the long-term need for clean firm resources.

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[13] American Clean Power – California Comments on Administrative Law Judge's Ruling Seeking Feedback on Mid-Term Reliability Analysis and Proposed Procurement Requirements, at 9 (March 26, 2021).

[14] Joint Comments of Natural Resources Defense Council, Union of Concerned Scientists, California Environmental Justice Alliance, Defenders of Wildlife, Environmental Defense Fund, Friends of The Earth, Green Power Institute, and Sierra Club on Administrative Law Judge's Ruling Issued February 22, 2021 (March 26, 2021).

[15] Public Advocates Office Comments on Administrative Law Judge's Ruling Seeking Feedback on Mid-Term Reliability Analysis and Proposed Procurement Requirements, at 33 (March 26, 2021).

14. Comment on how fossil-fueled resources should be treated for purposes of compliance with the procurement requirements proposed in this ruling.

EDF strongly opposes the development of new fossil resources, including repowering at the site of existing resources. Our study shows that California can affordably and reliably decarbonize the electric grid; the Commission should not keep a tight grip on fossil resources under the guise of maintaining reliability. Contracts with existing fossil resources should only be used as a last resort, for a term of five years or less, and in a way that facilitates emissions and pollution reductions.[16] Applications for approval of those contracts should demonstrate that the LSE has a plan to replace the most relied-upon polluting resources with a clean alternative at the end of the contract term.[17]

This procurement could serve both system reliability needs and reduce local reliance on fossil resources if appropriately targeted. EDF supports the targeting of clean procurement to certain local areas in order serve local capacity needs with clean resources and facilitate the retirement of polluting resources. CEJA and Sierra Club urge the Commission to direct "a significant percentage of the clean procurement to Los Angeles [] Basin and to the San Joaquin Valley to facilitate the eventual closure of Aliso Canyon and gas facilities in the most overburdened communities."[18] Pacific Gas and Electric Company similarly recommends targeting procurement to constrained local areas,[19] which if restricted to clean resources would

[16] Environmental Defense Fund Comments at 9-11; *id*. at 13.

[17] Environmental Defense Fund Comments at 9-11.

[18] CEJA/Sierra Club Comments at 2.

[19] Opening Comments of Pacific Gas and Electric Company to Administrative Law Judge's Ruling Seeking Feedback on Mid-Term Reliability Analysis and Proposed Procurement Requirements, at 5-7 (March 26, 2021).

reduce the grid's reliance on fossil resources in those constrained areas. Moreover, EDF agrees with CEJA and Sierra Club that the bid process should consider a project's negative impacts on and benefits to disadvantaged communities.[20]

III. Conclusion

EDF thanks the Commission for the opportunity to submit these reply comments.

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By: /s/ Yochanan Zakai

Ellison Folk
Yochanan Zakai[*]
SHUTE, MIHALY & WEINBERGER LLP
396 Hayes Street
San Francisco, California 94102
(415) 552-7272
folk@smwlaw.com
yzakai@smwlaw.com

[20] CEJA/Sierra Club Comments at 13.

[*] Mr. Zakai is a member of the Oregon State Bar; he is not a member of the State Bar of California.